

Claim

1. A gas separator fixing structure provided with a gas separator having a gas separation membrane formed on at least one surface of a tubular support having a through hole in axial direction and comprising porous ceramics, characterized in that a cap-like metal member and a ring-shaped metal member are compression-fixed to one and the other open end of the gas separator through seal members, respectively, and seal members are gland packings.

2. A gas separator fixing structure according to claim 1, wherein the cap-like metal member comprises a first cap-like or ring-shaped packing presser which gives a tightening pressure to one of the gland packings in the axial direction of the tubular support and a ring-shaped or cap-like lower stopper which inhibits movement of the one of the gland packings, and the ring-shaped metal member comprises a second ring-shaped packing presser which gives a tightening pressure to another gland packing in the axial direction of the tubular support and a ring-shaped upper stopper which inhibits movement of the another gland packing.

3. A gas separator fixing structure according to claim 2, wherein the first packing presser has a convex shape which directly presses one of the gland packings by its tip portion, and the lower stopper has a concave shape which directly contacts with the one of the gland packings and fits to the convex shape of the first packing presser, and the second packing presser has a convex shape which directly presses

another gland packing by its tip portion, and the upper stopper has a concave shape which directly contacts with the another gland packing and can fit to the convex shape of the second packing presser.

5 4. A gas separator fixing structure provided with a gas separator having a gas separation membrane formed on at least one surface of a tubular support having a through hole in axial direction and comprising porous ceramics, characterized in that ring-shaped metal members are fixed to both open ends of
10 the gas separator through seal members, respectively, and the seal members are gland packings.

 5. A gas separator fixing structure according to claim 4, wherein the ring-shaped metal member comprises a ring-shaped packing presser which gives a tightening pressure to the gland
15 packing in the axial direction of the tubular support and a ring-shaped stopper which inhibits movement of the gland packing.

 6. A gas separator fixing structure according to claim 5, wherein the ring-shaped packing presser has a convex shape
20 which directly presses the gland packing by its tip portion, and the ring-shaped stopper has a concave shape which directly contacts with the gland packing and can fit to the convex shape of the ring-shaped packing presser.

 7. A gas separator fixing structure according to any one
25 of claims 1-6, wherein the tubular support has a plurality of through holes arranged in rows.

 8. A gas separator fixing structure according to any one of claims 1-7, wherein the maximum value of operating

temperature range of the gland packing is 300°C or higher.

9. A gas separator fixing structure according to any one of claims 1-8, wherein the maximum value of operating temperature range of the gland packing in a non-oxidizing atmosphere is 350°C or higher.

10. A gas separator fixing structure according to any one of claims 1-9, wherein the maximum value of operating temperature range of the gland packing in a non-oxidizing atmosphere is 600°C or higher.

11. A gas separator fixing structure according to any one of claims 1-10, wherein the main component of the gland packings is expanded graphite.

12. A gas separator fixing structure according to any one of claims 1-11, wherein the porous ceramics is alumina.

13. A gas separator fixing structure according to any one of claims 1-12, wherein the gas separation membrane is a hydrogen separation membrane through which hydrogen selectively permeates.

14. A gas separator fixing structure according to any one of claims 1-13, wherein the gas separation membrane comprises palladium or a metal containing palladium.

15. A gas separator fixing structure according to any one of claims 1-14, wherein the material constituting the cap-like metal member and/or ring-shaped metal member has a thermal expansion coefficient of $4 \times 10^{-6} - 10 \times 10^{-6}/^{\circ}\text{C}$.

16. A gas separator fixing structure according to any one of claims 1-15, wherein the material constituting the cap-like metal member and/or ring-shaped metal member is

Permalloy.

17. A gas separator fixing structure according to any one of claims 1-16 which is used at a temperature in the range of 250-1650°C.

5 18. A gas separator fixing structure according to any one of claims 1-17 which is used at a temperature in the range of 300-600°C.

19. A gas separator fixing structure according to any one of claims 1-18 which is used under a pressure of 0.1-10 MPa
10 in the total pressure of the gas to be treated.

20. A gas separating device provided with a pressure container, characterized in that the ring-shaped metal member of the gas separator fixing structure according to any one of claims 1-19 is fixed to the inner surface of the pressure
15 container.

21. A gas separating device in which a specific gas component in a gas to be treated which flows into the device from an inlet is allowed to permeate a gas separation membrane and to flow out from a first outlet, and the gas which does not
20 permeate through the gas separation member is allowed to flow out from a second outlet, characterized in that the gas separator fixing structure of any one of claims 4-19 is fixed in a container having an inlet, a first outlet and a second outlet.

22. A gas separating device according to claim 21 which
25 is provided with a buffer which absorbs expansion of the gas separator.